

LIFE CYCLE ASSESSMENT OF MICROBIAL FUEL CELL

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Abstract. Wastewater treatment industry is energy intensive. Large amount of environmental burden was brought due to the energy use for the wastewater treatment. Much attention has been focused on bioelectrochemical systems in recent years, since these systems can use wastewater as a renewable resource for the production of energy, and byproducts. One of the bioelectrochemical systems is called MFC (microbial Fuel Cell), it uses bacterial metabolism to produce electrical current by breaking down a wide range organic substrates exist in the wastewater, the wastewater after treated had lower nitrate and TSS levels when compared with traditional aeration wastewater treatment. Since MFC technology can produce electricity while operation and provide better quality effluent, it can be treated as a promising alternative to traditional wastewater treatment. A comprehensive evaluation of the process is needed to analysis its environmental performance. Life cycle assessment is a systematic method which can provide a holistic picture on the overall impact of the system and allows the comparison between different systems on environmental grounds. It avoid burden – shifting, which means transfer the environment impact from one stage to another. Only life cycle assessment can avoid the burden shifting. Here, we did a LCA of MFC using food waste input, analyzing its overall environmental impact, and comparing MFC's performances with traditional aeration treatment. This analyze provides guidelines for MFC process design and optimization, and help people to have a better understanding of its environmental performance compared with traditional aeration treatment.